

# Heterodyne Spectrometer

Completed Technology Project (2017 - 2018)



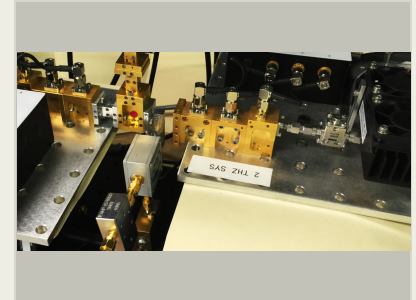
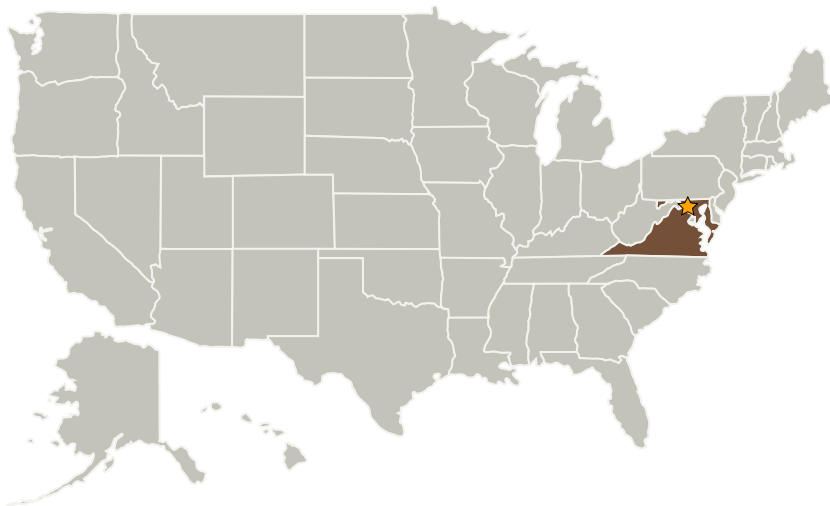
## Project Introduction

The objective of this IRAD is to develop a compact, high spectral sensitivity and tunable heterodyne spectrometer front-end receiver with a optimal system noise temperature.

## Anticipated Benefits

Potential use of a compact and room temperature THz receiver/spectrometer is to detect OH for the Moon and to understand the formation of cometary coma, where an accounting of all volatile components, OH and H<sub>2</sub>O, is required to understand its volatile exosphere. This instrument will also allow us to retrieve the surface abundance of these compounds on active icy moons, and it can be used to quantify the D/H ratio for objects throughout the solar system to use as a diagnostic to map out the evolution of our solar system.

## Primary U.S. Work Locations and Key Partners



Heterdyne Spectrometer

## Table of Contents

Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	1
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3
Supported Mission Type	3

Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Virginia Diodes, Inc.	Supporting Organization	Industry	Charlottesville, Virginia

# Heterodyne Spectrometer

Completed Technology Project (2017 - 2018)



Co-Funding Partners	Type	Location
Virginia Diodes, Inc.	Industry	Charlottesville, Virginia

Primary U.S. Work Locations	
Maryland	Virginia

## Images



### Heterodyne Spectrometer

Heterodyne Spectrometer  
(<https://techport.nasa.gov/image/32139>)

## Organizational Responsibility

### Responsible Mission Directorate:

Mission Support Directorate (MSD)

### Lead Center / Facility:

Goddard Space Flight Center (GSFC)

### Responsible Program:

Center Independent Research & Development: GSFC IRAD

## Project Management

### Program Manager:

Peter M Hughes

### Project Managers:

Terry Doiron  
Brook Lakew  
Michael J Amato

### Principal Investigator:

Berhanu T Bulcha

### Co-Investigator:

Jeffrey L Hesler

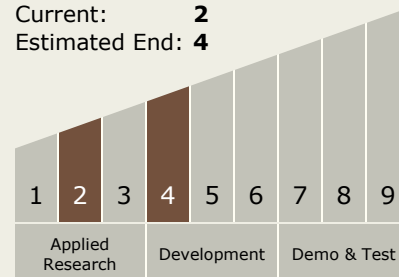
# Heterodyne Spectrometer

Completed Technology Project (2017 - 2018)



## Technology Maturity (TRL)

Start: 2  
Current: 2  
Estimated End: 4



## Technology Areas

### Primary:

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

## Target Destinations

Earth, The Moon, Others Inside the Solar System

## Supported Mission Type

Planned Mission (Pull)